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VOL. XVI. NO. 4.—BOTANICAL GAZETTE.—APR., 1891.

New or noteworthy Compositæ from Guatemala.

JOHN M. COULTER.

Mr. John Donnell Smith has placed in my hands for determination his recent and large collections of Compositæ from Guatemala. From the long and interesting list of species that these collections contain, the following have been selected for publication as being new or especially noteworthy. In the final and critical study of species the herbarium and library of Harvard University were used, and thanks are due to Dr. Sereno Watson for his courtesy in supplying every facility for such study. Mr. Henry E. Seaton, my assistant, made all the dissections and rendered valuable service in generic determinations.

VERNONIA TRIFLOSCULOSA HBK.—Published descriptions say that the leaves are "very entire," but specimens from San Luis, Depart. Escuintla (*J. D. S.* 2377), show that the larger leaves are apt to have some callous serrulations.

VERNONIA LEIOCARPA DC.—Abundant and very fine material from Pacaya, Depart. Amatitlan (*J. D. S.* 2405), show that the heads are at first cylindrical, becoming "ovate" only with ripening and spreading, and that they are mostly 3-(sometimes 4)flowered, rather than "5-flowered."

VERNONIA SALVINÆ Hemsl., var. **canescens,** n. var.—Leaves white beneath with a dense pannose tomentum.—Coban, Depart. Alta Verapaz, March, 1881 (*Türckheim* 583).

STEVIA COMPACTA Benth.—Specimens from Volcan de Agua (*J. D. S.* 2327) show that the under surface of the leaves is apt to be more or less woolly, and that the branches and inflorescence may have more or less floccose wool.

Eupatorium Donnell-Smithii n. sp.—Usually tall and rather stout perennial herb, hirsutely pubescent especially above and in the inflorescence (the spreading hairs of the stem somewhat glandular and viscid), often glabrate below, leafy up to and in the inflorescence: leaves opposite, broadly ovate, crenate-serrate, acute or acuminate, more or less pubescent or even hirsute especially beneath and on the prominent veins, 4 to 10 cm. long, 2.5 to 6.5 cm. broad, the lower long-petioled,

the uppermost short-petioled: heads 4 to 7 mm. high, numerous in a usually broad and ample leafy panicle, with white flowers: involucral bracts narrowly oblong, acute or acuminate, in about two nearly equal rows, thickened and conspicuously striate-nerved below, thinner and sometimes almost scarious at tip (especially the inner ones, which are also more decidedly acuminate or even mucronate-tipped), the outer ones more or less hirsute (often densely so), the inner ones glabrous or chiefly pubescent at tip: heads 40 to 50-flowered, with a flat or slightly convex receptacle and corolla-lobes bearded externally: achenes pubescent on the ribs, with scanty and barbellate pappus.—Aceituna, Depart. Guatemala, alt. 4600 ft., Feb. 1889 (*J. D. S.* 2374); Coban, Depart. Alta Verapaz, alt. 4300 ft., April, 1889 (*J. D. S.* 1603); Sarnac, Depart. Alta Verapaz, alt. 4600 ft., April, 1889 (*J. D. S.* 1602); Volcan de Agua, Depart. Zacatepequez, alt. 9500 ft., April, 1890 (*J. D. S.* 2329); Guatemala, Depart. Guatemala, alt. 5000 ft., Feb., 1890 (*J. D. S.* 2365).—This species seems closely related to *E. ciliatum* Less., to which it was referred by Hemsley (*Bourgeau* 1927) and John Donnell Smith (*Türckheim* 407, in 1887); but *E. ciliatum* has 18 to 22 flowers in a head and a glabrous corolla, while *E. Donnell-Smithii* has 40 to 50 flowers in a head and a bearded corolla.

Var. **parvifolium** n. var.—Much smoother, with smaller leaves, and but 20 to 35 flowers in a head.—Dueñas, Depart. Zacatepequez, alt. 5000 ft., April, 1890 (*J. D. S.* 2333).

EUPATORIUM AZUREUM DC.?—Apparently a form of this species was collected on Volcan de Agua, Depart. Zacatepequez, alt. 9000 ft., April, 1890 (*J. D. S.* 2326), in which the heads are but 12 to 16-flowered.

Eupatorium lyratum n. sp.—A stout apparently low branching perennial herb, softly pubescent throughout (the stem often even hirsute and more or less glandular): leaves alternate, the lower ones obovate, lyrately-pinnatifid and petioled, 5 to 9 cm. long, 2.5 to 4 cm. wide, gradually becoming less lyrate, irregularly toothed, sessile and even auriculate-clasping above, the uppermost ones (in the inflorescence) merely ovate (acute) and slightly toothed or entire: heads about 6 mm. high, rather few in a very loose irregular leafy panicle, with white flowers: involucral bracts linear-lanceolate to linear, acuminate, very lax in 3 or more unequal rows (some of them exceeding the head), the inner ones linear

and somewhat scarious, all more or less pubescent (the inner ones chiefly so at the tips), the outer ones often very much so (even hirsute) and more or less glandular: heads many-flowered, with a flat receptacle, and very long and slender corolla-tubes with very minute lobes (if any): achenes pubescent, with scanty but long and conspicuous, very minutely barbed soft white pappus.—Laguna Amatitlan, Depart. Amatitlan, alt. 3900 ft., March, 1890 (*J. D. S.* 2393). A species remarkable in its leaf characters and very long and slender corolla tube.

Eupatorium Rafaelense n. sp.—A small shrub, glabrous or minutely pubescent: leaves opposite, rather long petioled, ovate to lance-ovate, acute or acuminate, from crenate-serrate to minutely so or even entire, 3 to 7.5 cm. long, 2.5 to 3.5 cm. wide (but the numerous specimens show only the leaves of the branchlets): heads 9 to 18 mm. high, in loose or rather compact cymose clusters, terminating opposite divergent branchlets, the clusters becoming more compacted into a thyrsoid inflorescence above: involucral bracts linear-oblong, often purplish, acute or obtuse, in about 3 unequal lax rows, about half as long as the head, striate-nerved below, more or less pubescent and glandular (especially the outer ones), all with ciliate margins: heads 35 to 45-flowered, with a flattish or slightly convex receptacle and glabrous corolla: achenes scabrous-puberulent on the ribs, with conspicuous and barbellate white pappus.—San Rafael, Depart. Zacatepequez, alt. 6500 feet, April, 1890 (*J. D. S.* 2331); Guatemala, Depart. Guatemala, alt. 5000 feet, Feb., 1890 (*J. D. S.* 2368).

EUPATORIUM POPULIFOLIUM HBK.—This species seems to be very variable in the size of its leaves and flower clusters. Specimens from Laguna Amatitlan (*J. D. S.* 2400) are reed-like in habit, becoming 18 feet high, with leaves a foot or more long, compact thyrsoid panicles over a foot long and broad, and uniformly 11-flowered heads. Specimens from Cuyuta, Depart. Escuintla (*J. D. S.* 2399), are 12 feet high, with leaves not half as large, flower clusters only 5 or 6 inches long and 3 or 4 broad, and uniformly 9-flowered heads.

EUPATORIUM TUERCKHEIMII Klatt.—Specimens from Pansamalá (*Türckheim* 1342) show broader leaves than the type. They are ovate and long-acuminate, often nearly 2 inches broad.

EUPATORIUM AGERATIFOLIUM DC., var. **purpureum** nov. var.—Inflorescence with a dense purple glandular pubescence and the involucral bracts purple.—Coban, Depart. Alta Verapaz, alt. 4600 feet, May, 1887 (*Türckheim* 52).

Brickellia Pacayensis n. sp.—Closely related to *B. Hartwegi* (*Eupatorium rigidum* Benth. Pl. Hartw. 88) but the whole upper part of the plant is blackened with stipitate glands, the heads are 20 to 30-flowered, and the involucral scales are often much narrowed (linear-lanceolate to linear), longer, and more decidedly acuminate: the pappus is minutely but densely serrulate and the achenes densely soft pubescent. —Pacaya, Depart. Amatitlan, alt. 6000 feet, March, 1890 (*J. D. S.* 2389).

APLOPAPPUS STOLONIFERUS DC., var. **glabratus** nov. var. —Leaves glabrate, not all "very hirsute" as in the type.— A curious and handsome *Aplopappus* found on the crater of Volcan de Agua, Depart. Zacatepequez, alt. 12100 feet, April, 1890 (*J. D. S.* 2328).

Aphanostephus Pinulensis n. sp.—A stout very leafy and branching perennial 3 to 4.5 dm. high, rather glaucous and softly pubescent, the young leaves and branches and inflorescence more or less floccose: leaves punctate, lance-ovate to obovate in outline, the lower (blade) 9 cm. long, and on long petioles, gradually becoming smaller upwards, bipinnatifid, the oblong obtuse pinnæ more or less confluent and irregularly pinnately cleft and toothed (the whole plant with its conspicuous heads having an Achillea look): heads on short peduncles collected in a terminal corymbose cluster: bracts of the involucre lanceolate and strongly carinate: rays 5 to 8 mm. long, white, mostly reflexed with age: base of the corolla-tube in age prominently thickened and indurated, more or less persistent on the strongly angulate-costate whitish achene: pappus a very short crown with toothed edge.—Pinula, Depart. Guatemala, alt. 4400 feet, Feb., 1890 (*J. D. S.* 2407). A remarkable looking Aphanostephus on account of its broad bipinnatifid leaves.

Clibadium Donnell-Smithii n. sp.—Stem and inflorescence hirsute: leaves broadly ovate, mostly long-acuminate, with spinulose-crenulate serrulations, velvety pubescent beneath (even hirsute on the veins), scabrous above, 12 to 25 cm. long, 6 to 16 cm. broad, on long petioles: heads 4 to 5 mm. high,

in a rather small open cymose panicle: involucral bracts ovate, acute or cuspidate, ciliate on the margins, sparingly so on the back: corolla-lobes of sterile flowers with scanty pubescence if any: achenes obovate, conspicuously pilose at apex.—Guatemala, Depart. Guatemala, alt. 5000 feet, Feb., 1890 (*J. D. S.* 2347). This species is near *C. Surinamense* L., var. *asperum* Baker, but it differs in its comparatively smooth corolla-lobes of the sterile flowers, and strikingly in its large broad leaves, velvety pubescent beneath, and long petioles. From *C. arboreum* Donnell Smith it differs in its involucral bracts, leaves, and villous achenes.

MONTANOA OVALIFOLIA DC. is worthy of mention as being a plant reported before only from Bogota. These specimens are from Pacaya, Depart. Amatitlan, alt. 6000 feet, March, 1890 (*J. D. S.* 2352).

Tetragonotheca Guatemalensis n. sp.—Apparently closely allied to *T. Texana* Gray and Engelm.; but the leaves are deltoid, with mucronate serrulations and usually one or two prominent basal teeth, abruptly decurrent into a winged petiole which does not enlarge or clasp at base; leaves of the inflorescence ovate-lanceolate to lanceolate, acuminate, tapering gradually to a petiole: corolla-tubes, both of the ray and disk-flowers, very long and slender, more or less glandular pubescent, as is the whole inflorescence: pappus none in our specimens.—Senahú, Depart. Alta Verapaz, alt. 3500 feet, April, 1889 (*J. D. S.* 1592). A remarkable *Tetragonotheca* on account of its long and slender corolla tubes, the showy yellow ligules looking conspicuously slender-clawed.

Zexmenia Dulcis n. sp.—Pubescent and branching: leaves thickish, opposite, short-petioled, ovate or oblong, acute, distantly mucronate-serrate, scabrous on both sides but very much more so above, 6 to 9 cm. long, 3.5 to 5 cm. broad: heads on rather long peduncles (2.5 to 5 cm.), about 10 mm. high: involucral bracts lanceolate to ovate, mostly acute, scabrous with rough hairs: bracts of the receptacle winged on the back, with a sharply acute or acuminate minutely toothed apex: achenes of the ray 3-angled and 3-awned; those of the disk broadly winged, with usually two prominent unequal awns and numerous small squamellæ.—Rio Dulce, Depart. Livingston, alt. 0 feet, March, 1889 (*J. D. S.* 1607). Resembling *Z. scandens* Hemsl. somewhat, but differs from that species in its acute leaves, long-peduncled and smaller heads,

acute involucral bracts, merely 3-angled ray achenes, and broadly-winged disk achenes. Much more nearly related to *Z. trachylepis* Hemsl., but differs in its longer-pedunculate heads, acute involucral bracts, very acute or acuminate ("rounded at apex" in *Z. trachylepis*) chaff and unequal awns.

TITHONIA TUBÆFORMIS Lass.—Specimens collected at Pacaya, Depart. Amatitlan (*J. D. S.* 2390), show a peculiar habit. All the specimens in the Gray Herbarium are tall branching plants, while many of these are low and widely divaricate-branched at the very base.

MELANTHERA HASTATA Rich.—It is evident that this species must include *M. oxylepsis* DC., as in specimens from Pinula and Rio Amatitlan (*J. D. S.* 2342 and 2341) there are all gradations in the leaves from ovate-deltoid (*M. oxylepsis*) to hastately 3-lobed (*M. hastata*).

ENCELIA MEXICANA Mart.—This variable species was collected at Laguna Amatitlan (*J. D. S.* 2408), and in comparing it with specimens in the Gray Herbarium it seems evident enough that it should be considered to include *E. subaristata* Gray, *E. heterophylla* Hemsl., *E. fœtida* Hemsl., and *E. cordata* Hemsl., as indicated by Dr. Gray in an herbarium note.

SPILANTHES REPENS Michx. has been heretofore reported only from the southern United States. It now comes from Coban, Depart. Alta Verapaz, alt. 4300 feet (*J. D. S.* 1614).

SPILANTHES BECCABUNGA D C.—Specimens from Dueñas, Depart. Zacatepequez, alt. 5000 feet (*J. D. S.* 2125) show that the achenes are often pubescent.

BIDENS HETEROSPERMA Gray.—Specimens from Guatemala, Depart. Guatemala, alt. 5000 feet (*J. D. S.* 2351), show that the achenes are not always glabrous.

Bidens Antiguensis n. sp.—§ PSILOCARPÆA. Closely resembling *B. leucantha* Willd. but the rays (mostly present) narrowly oblong, acute, bright yellow (8 to 12 mm. long), and the 2 (rarely 3) rigid awns perfectly smooth and widely divaricate: exceedingly variable in pubescence, from glabrous to pilose-pubescent.—Antigua, Depart. Zacatepequez, alt. 5000 feet, April, 1890 (*J. D. S.* 2354); San Luis, Depart. Escuintla, March, 1890 (*J. D. S.* 2375).

Senecio Donnell-Smithii n. sp.—A very stout woolly-pubescent perennial: leaves alternate, thick, very broadly ovate to rotund in outline, cordate at base, undulately lobed and margined with blackish mucronulations, glabrous above,

densely whitish woolly beneath, 9 to 15 cm. long, 8 to 11 cm. broad, on stout petioles: heads 8 to 10 mm. high, in a large terminal very compact panicle: involucral bracts lanceolate, hirsute and purple-tipped: ray-flowers 6 to 8, with narrowly oblong yellow ligules 4 to 6 mm. long; disk-flowers 12 to 16. —Volcan de Agua, Depart. Zacatepequez, alt. 11000 feet, April, 1890 (*J. D. S.* 2362). Near *S. Aschenbornianus* Schauer, but differs in being stouter, with much more compact inflorescence, leaves very smooth above and densely woolly beneath, hirsute purple-tipped involucral scales, and more numerous disk-flowers. A very striking and handsome species.

SENECIO GHIESBREGHTII Hort. Hal. Regel (*S. grandifolius* of authors, not Less.)—Specimens from Serraquitché, Depart. Alta Verapaz, alt. 2500 feet, (*J. D. S.* 1598), show that the characters of the species must be made to include not only ovate, but also elongated ovate or even obovate leaves, which are often acute at base as well as apex, and whose margins vary from sinuate-dentate to entire. These Guatemalan specimens also show that the disk-flowers may be fewer than 10, most of the heads containing but 5 or 6.

SENECIO GHIESBREGHTII Hort. Hal. Regel, var. **pauciflorus** n. var.—Differs from the species in having fewer-flowered heads and hairy involucral bracts.—Sapote, Depart. Guatemala, alt. 4300 feet, March, 1890 (*J. D. S.* 2359); Chucaneb, Depart. Alta Verapaz, alt. 6000 feet, April, 1889 (*J. D. S.* 1606). *S. Ghiesbreghtii* has 4 to 6 ray-flowers and 10 disk-flowers; while the variety has uniformly 2 ray-flowers and 3 disk-flowers.

Senecio Cobanensis n. sp.—A woody-stemmed glabrous and very leafy plant: leaves scattered, thickish, elongated, narrowly lanceolate to oblanceolate and acuminate, on slender petioles, usually with distant serrulations, 10 to 14 cm. long, 2 to 2.5 cm. broad, readily falling off and leaving the stem covered with prominent scars: heads discoid, about 6 mm. high, in terminal rather loose corymbose panicles: involucral bracts about as long as the head, linear-oblong, obtuse or acutish, thick and rigid, keeled and somewhat saccate below (forming a truncate base to the head), often with very small accessory bractlets: disk-corollas about 6, deeply 5-lobed, the lobes usually with inflexed tips: achenes glabrous.—Coban, Depart. Alta Verapaz, alt. 4300 feet, May, 1887

(*Türckheim* 1158). A species perhaps nearest to *S. Candelariæ* Benth., but very distinct.

PEREZIA NUDICAULIS Gray.—Specimens from Guatemala, Depart. Guatemala (*J. D. S.* 2364) show that the leaves are not "all runcinate," some of them being simply ovate.

SENECIO KERMESINUS Hemsl. (*Gynoxys Hœnkei* DC.)—Abundant material from Guatemala, Depart. Guatemala, alt. 5000 feet (*J. D. S.* 2356), shows that the original description of De Candolle needs emendation, as that was professedly drawn from imperfect specimens showing only the upper leaves. The lower leaves are coriaceous, rugose veiny, and more or less coarsely toothed. The heads also frequently have more numerous flowers. The plant is a very handsome one, climbing high over trees.

Wabash College, Crawfordsville, Ind.

Notes on North American Willows. VI.

M. S. BEBB.

A review of the willows of California.

More than ten years have elapsed since the publication of the second volume of the Flora of California. I wish to look over the account given therein of the willows, make some comments in the light of a better information, and correct mistakes.

1.[1] SALIX NIGRA Marsh.—This species, in its distribution from Texas southward and westward, presents two diverging lines of variation. Southward, along the Gulf coast, it passes by insensible gradations into the Mexican form of *S. Humboldtiana*. Westward, across the plains of New Mexico and Arizona, it takes on the character of var. *venulosa* Anders. with the lower leaves of the branches oblong, rather obtuse, often mucronate, later leaves at the tips of the branches attenuate-linear, all yellowish-green (at least in herbarium specimens) and veiny; mature capsules yellowish and long pediceled. Var. *Wrightii* And. is the same thing only representing (as it appears to me) an abnormal or retarded

[1] The numbers correspond with those of the Flora of California.

growth of the individual tree from which Wright's specimens were taken. Nevertheless, as Andersson insists upon the "short, thick, densely flowered aments," as essentially distinguishing this variety, it may be as well to avoid forcing a decision upon the scanty material at present available. *S. nigra* var. *venulosa* extends to the Sierra Nevada Mountains, but whether Bolander's specimens (leaves only), from Cache Creek near Clear Lake, show a reversion on the Pacific slope to something like the typical form of the species, or whether these were taken, late in the season, from the extreme tips of branches of var. *venulosa*, or whether it is not even more probable still that these long, narrow, sharply serrate leaves indicate an outlying northern station for *S. Humboldtiana* var. *oxyphylla* is a question that can receive no satisfactory answer until much more is known than we now know of the forms which *S. nigra* assumes in southern California and northern Mexico.

2. S. LÆVIGATA Bebb.—This fine willow reaches its fullest development in central and southern California. It is not know as an Oregon species, though collected by Mr. Joseph Howell, just south of the boundary line in Siskyyou county. Southward it takes on a serotinous mode of inflorescence, like other northern species which invade the tropics.

3. S. LASIANDRA Benth.—Local observers may be inclined to regard the more pronounced varieties as distinct, but if so I am unable to limit them. In a broad and comprehensive view the propriety of uniting the Rocky mountain and Pacific coast forms under one species and keeping this distinct from *S. lucida* of the Atlantic coast will, I believe, be conceded. *S. lucida* var. *macrophylla* Anders. referred "from the description" to *S. lasiandra* var. *lancifolia* I have since seen, not only in Dr. Lyall's (type) specimens, but in others from the Columbia River, in which the peculiarity described is exhibited in a still more marked degree. It is simply a broad-leaved, showy-flowered state of var. *lancifolia* with nothing whatever to indicate any particular affinity with *S. lucida*.

4, 5, 6. THE LONGIFOLIÆ.—This group is distinctively American, clearly defined on every side, shading off into no other by variation, hybridizing with none. It is not connected with Old World forms by any synthetic type of the present or of any preceding period, but apparently was derived from the Mexican plateau at the close of the Tertiary.

In keeping with this view it finds its fullest development and greatest variation in form and stature on the Pacific slope. Eastward it declines in vigor and variability until on the Atlantic coast it is of rare occurrence from New Brunswick to the Potomac. Clearly marked as are the outer limits of the group it presents no lines of cleavage within by which it can be satisfactorily divided. No natural characters are found to coincide with such assumed distinctions, for instance, as the "linear lobes of the stigma," made prominent in the attempt to separate *S. sessilifolia*. Each portion after sub-division remains as heterogeneous as was before the aggregate group. It may be possible, by emphasizing first one character and then another, as these are found to predominate in the different forms, to designate a number of sub-species and varieties; but so bewildering and intangible is the reticulated intergrading that the difficulty of segregation seems only to be heightened by every fresh acquisition of material.

7. S. CORDATA Muhl.—No American willow has a wider distribution than this, from the Gulf States to California and northward in the interior to the Mackenzie River, and perhaps none other—not even excepting aggregate *S. longifolia*—presents more the appearance of a "congeries of species in the making." It differs from *S. longifolia* however in being, of all our willows, the one which hybridizes most freely with others and this implies that even where actual hybridity can not be proven it is more or less affected by association with other willows in different portions of its wide area of distribution.

8. S. LASIOLEPIS Benth.—Ten years ago this species was known to the writer only from Californian specimens. Even at that time three dominant lines of development were recognized, but these have since been found to lead out to such widely divergent extremes as would certainly be admitted as distinct species were it not for the intergrading. The most remarkable of these, exhibiting the var. *Bigelovii* in its farthest departure from the typical *lasiolepis* of southern California, is sent to me by Mr. C. V. Piper, from near Seattle, Washington: leaves obovate, oblong or oblanceolate, coarsely and irregularly repand-serrate, 2 inches wide by 4–7 inches long; aments as thick and copiously silky with long hairs as those of *S. Hookeriana!* As if *S. lasiolepis* were not already overloaded with aberrant forms we have to mention still another, provisionally referred only, found by Prof. Greene on

Santa Cruz Island. Unfortunately only the leaves were obtained. These are clothed beneath with a dense velvety, *persistent tomentum*. The character "filaments more or less united at base" should be more distinctly emphasized: it is really quite constant and will often serve to identify staminate specimens unaccompanied by leaves.

9. S. FLAVESCENS Nutt.—The name was adopted at first from Nuttall's description but I have since seen specimens named by Nuttall himself which confirm beyond all question the identity of the species. The time-honored name of the Flora Boreali-Americana, *S. Scouleriana*, will probably always be retained for the Pacific Coast forms which differ most widely from the type, but as this difference is observed almost wholly in the form of the leaves and as the leaves of the type specimens of *Scouleriana*, in the Hookerian herbarium are really those of *S. Sitchensis*, we are obliged to acknowledge a certain inconsistency, for which we find excuse in a desire to perpetuate among the willows of the N. W. Coast the name of the early explorer. This is another polymorphous species, which would be more faithfullv reported if broken up into a series of varieties.

10. S. MACROCARPA Nutt., var. ARGENTEA—This beautiful little willow, with its silvery-silky capsules and foliage, and twigs overspread by a delicate glaucous bloom, may be regarded as a marked variety of the typical *S. macrocarpa* Nutt. of the Columbia River valley. An intermediate form has been collected by Mr. Patterson in the mountains of Colorado. As has already been shown (BOT. GAZETTE vol. x. p. 221) Anderson transferred Nuttall's name to a single specimen, from Hudson's Bay, in the Kew Herbarium, and then redescribed (essentially) the Oregon plant under the name of *S. Geyeriana*.

11. S. SITCHENSIS Sanson.—Following either the analytical key or the subordinate grouping of the species, the solitary stamen now known to be constantly characteristic of *S. Sitchensis* would carry this in all its forms, over to no. 19, *S. Coulteri*—and rightly so: for while *S. Coulteri* represents nothing more than an abnormal development of *Sitchensis*, the species itself, in virtue of the single stamen, the long, slender, flexuose aments and peculiar vesture and veining of the leaves, must become the type of a new group (SITCHENSES) and be removed from its present setting. It was a mistake to arrange the little willow "collected on a high mountain

near Donner Pass" by Dr. Torrey, as a variety of *S. Sitchensis*. Similar forms occur from British America southward to Utah and California—mostly in the Rocky Mountains, all seeming to belong to one species for which *S. pellita* Anders. is the oldest name; unless this is found to be anticipated by the still older and very obscure *S. Drummondiana* Barratt. Furthermore the very interesting question whether this is a mountain equivalent of the coast *Sitchensis* remains to be demonstrated when we know the staminate aments. Why these have eluded so many collectors is a mystery! Drummond's specimens are without staminate flowers to begin with and although in recent years some of our best collectors in the West have, at my request, endeavored to secure specimens which would complete our knowledge of the species, their efforts have been, thus far, of no avail.

12. S. LEMMONI Bebb.—This appeared abundantly, and in great diversity of form in Mr. Lemmon's collections, but has not been further made known as a Californian plant. It has been found since, however, by Mr. Cusick in the mountains of eastern Oregon at an altitude of 4,000 feet.

13. S. AUSTINÆ Bebb.—This must be held in abeyance. The leaves described belong to *S. Lemmoni*, and in some (though not all) of the specimens staminate aments of *S. lasiolepis* were intermixed. There yet remain the fertile aments not identifiable with any willow of the Pacific Coast region as at present understood. Leaves to match these will, I apprehend, be found to be of the *phylicifolia* type and the emended species, I hope, may continue to bear the name; but how longs shall we have to wait for the painstaking local observer who will collect flowers and fruit, and finally foliage from the same plant?

14. S. BREWERI Bebb.—Beyond all comparison this is the rarest and most obscure of North American willows. Only in a remote degree related to any species of the region in which it was found, in fact representing a group otherwise unknown throughout the length and breadth of the Western Continent, found but once and after the lapse of more than ten years still known only from that one meager collection—surely we have presented here every indication of a species verging close on extinction.

16. S. CALIFORNICA Bebb.—In the first paper of this series mention was made of a group of willows, intermediate as it

were between *S. glauca* and *S. cordata*, distributed over the alpine regions of the Sierra Nevada and Cascade Range, and of which *S. Californica* constituted the southernmost member. Within a year or two past the collections of Piper and Smith, on Mt. Rainier and of the Macouns—father and son—in British Columbia, have shown that *S. Barclayi* Anders. known heretofore as a species of the Alaskan coast, is the northernmost representative of the series. A further consideration of this group will be made the subject of a separate paper.

17. BROWNII Bebb, var. PETRÆA (Anders.). More variable in the Sierra Nevada than in the Rocky Mountains, and including *S. tenera* Anders. Andersson first named one of Dr. Lyall's Cascade mountain willows *S. phlebophylla*, and under this name the specimens were sent out from Kew. Afterwards he restricted the name *phlebophylla* to a species of high arctic distribution and re-named Lyall's plant *S. tenera*. Watson (Bot. King's Exped., p. 326,) finding one of his willows from the Uintas, 10,000—11,000 feet altitude, agreeing perfectly with the Lyall specimen in the Gray herbarium adopted the name which he found on the label, not suspecting—as, indeed, why should he?—that the Lyall plant had been made, later, the type of *S. tenera* and that the arctic species was exclusively arctic.

18. S. MONICA Bebb.—Were I to receive to-day the poor, stunted specimens upon which this doubtful species was founded they would go into an already well filled cover marked "undetermined" and there repose until something more definite could be known about them. But *S. Monica* is no longer subject to the whim of its author. What is it? Possibly a form of *S. chlorophylla* And. This is known to occur on Mt. Adams and the higher summits of the Cascades and has also been collected by Prof. L. F. Ward in the Wahsatch mountains at 8,000–11,000 feet altitude. It is rather remarkable than otherwise that it has not been found on the peaks of the Sierra Nevada in forms about which there could be no uncertainty; but until this is done, the expediency of adding the species to the state flora on the evidence afforded by the poor, battered specimens named *Monica*, is very questionable. For the very narrow scale and the bracts at the base of the staminate ament seem opposed to any such determination; nor can *Monica* be a starved, alpestrine form of *Californica*, for this is known from almost the same locality and its

identity unmistakable. On the whole it seems best that a species of such questionable validity should be dropped.

To the list of California willows, as known ten years ago, not a single addition has been made, though it is highly probable that *S. rostrata*, *S. vestita* and *S. reticulata* will be found in the Sierra Nevada; and *S. Hookeriana* (known to occur abundantly along the coast of Oregon down almost to the boundary line) may be confidently looked for at the mouth of the Klamath river.

Rockford, Ills.

Notes on the flora of the St. Croix region.

E. G. HILL.

The Dalles of the St. Croix and the neighboring rapids are a piece of scenery very attractive to one seeking the beautiful and picturesque in nature. They are formed by a belt of trappean rocks of the copper-bearing series which crosses the river in this region, making several ridges from 200 to 300 feet high. Softer sandstones of the Potsdam or Cambrian formation, mingled with conglomerates and shales at the points of contact, are laid down upon the trap in horizontal strata, or abut against the sides of its uplifted beds, clearly showing their unconformability. Through these rocks the river has worn a deep gorge, and by a series of rapids and low falls rushes along between bluffs descending rather steeply as wooded slopes. On the Minnesota side of the stream the bluffs recede from its banks far enough to leave a nearly level spot on which stands the lower part of the village of Taylor's Falls. On the opposite slope, in the state of Wisconsin, lies the village of St. Croix Falls. In the midst of the rapids the river is spanned by a bridge at a point where it becomes quite narrow at the head of a defile, making it easy to cross to either side. For some distance below the bridge the water rushes on over the sloping rocks in impetuous swirls, then makes a sudden bend and glides on with comparative placidity between cliffs from 100 to 200 feet high. The walls of these cliffs are either vertical or nearly so. The Dalles are properly that portion of the gorge beginning at the bridge, and furnish much the most imposing part of the scenery. It con-

tinues for several miles, but the rocks, composed of softer or less elevated materials have been worn away to a greater width, and the bluffs and cliffs again recede from the river, leaving a strip of flats along its banks. About two miles below Taylor's Falls another cañon is formed, called the Lower Dalles, but it lacks the wild rapids connected with the Upper Dalles.

To clamber over the rough rocks, to climb the steep ridges and the cliffs where practicable, to gather plants whose home is in such haunts, while enjoying the enchanting views, is delightful though wearisome work. One is also reminded that he is on ground somewhat classical for the botany of the upper Mississippi, since he is collecting in the footsteps of men who have honored names as pioneers in botanical exploration. Here Dr. Douglas Houghton collected plants in 1832, acting as surgeon and botanist to the expedition of Schoolcraft to the source of the Mississippi river. On its way home it explored the St. Croix, passing up this stream and crossing the narrow divide that separates it from the Brulé or Burntwood river, down which the party passed to Lake Superior. Some of the plants secured in this and the preceding expedition of 1831 are listed in the appendix to the narrative of the expedition to Itaska lake, and are credited to the St. Croix river. The late Dr. C. C. Parry, one of the members of Owen's Geological Survey, whose work included this region, collected here in 1848, and several of the plants given in the catalogue as a part of the report are from the St. Croix river, the Falls of the St. Croix taking their full share.

The time of visiting the Dalles was opportune in another respect, as it coincided with the occurrence of a log-jam for which this part of the St. Croix is noted. This had a botanical side, and furnished matters for reflection to one at all interested in the problem of forestry. To see the millions of feet of logs piled several deep in the river, and bridging it over a mile of its length, gave one a vivid idea of the rate of destruction at which the forests of pine along the upper St. Croix and its tributaries must be going on, in order to supply this material. And when this mass was added to the logs of numerous streams carrying their burdens to the Mississippi and the Great Lakes, and to the quantities of lumber transported by cars and water-craft, one could but ask in despair how long this can continue before the last stick is taken.

The forcing of the logs from their chaotic tangle by the skillful raftsmen looked like a perilous undertaking, but all passed off without serious accident. Many excursionists came from surrounding parts to see the jam, and watched the workmen with deep interest. The excitement of a spectator was at its height when a large section of the raft began to move, and the lumbermen hurried ashore to escape from the rush of logs coming down with resistless weight. There were heavy sounds of rubbing, and grinding and crushing, and if one of the smaller logs became fast in the rocks, or was caught and turned on end, it was quickly snapped in two. Again the huge raft crowded down from above and filled the space in the gorge vacated by the outgoing timbers, only to stop once more as it reached the sharp bend at the foot of the rapids, and the logs were wedged in between the cliffs. This operation was repeated several times, till the defile was cleared and the logs above ceased to come down in quantities sufficient to fill it. These were then loosened by degrees, and sent down in a safe number till the stream was cleared of obstructions after a work of a fortnight. As a witness of the jam and of the thousands of logs which, so to speak, passed in review, a deep impression was made upon my mind other than those due to its novel and exciting features. It represented a great waste of material from the point of view of true forestry and of the real lumber interests of the country. Multitudes of the logs cut for the mills were little more than poles, and far too many besides cut from trees too small and immature for the profit which a wise regard for the future would dictate. True it is claimed by lumbermen that it is best to cut all the merchantable trees from a tract they may be cutting over, because all that are left become a prey to fires rendered much more frequent and destructive by the dry remnants of trees. This may be a valid excuse under existing regulations; but it proves still more clearly the need of adequate forest management either by state or national government to check the waste from any cause.

There are features of more than usual botanical and geological interest to one working among the rocks of the St. Croix. The mass of the rocks is greenish, or grayish-green, and granular, porphyritic, or amygdaloidal in structure. Being unaware of the nature of the outcrop at the time of visiting the Dalles, their identity with those on the Keweenaw

Peninsula was at once recognized. Hand specimens of the two could hardly be distinguished from one another. They are such as bear the general designation of melaphyr, the diabase-porphyry of Irving.[1] It is evident to those studying the relations of plants and soil, that the materials arising from the decomposition of such rocks will to some extent affect the flora. The shaded cliffs, and crevices by which they are seamed and broken in many ways also afford a congenial home for numerous ferns. They were not only in great abundance, but also of fine development. They may be called the most characteristic features of the flora of the Dalles.

The most interesting fern I met with was *Aspidium fragrans* Swartz. Some fronds were nearly a foot long, exclusive of the chaffy stipe. Its pale or ashy color, its glandular pinnae, its balsamic fragrance, at once show that a fern quite different from the common kinds is in hand. It grows in the clefts of the rocks, preferring the shaded, vertical fissures, clinging to them where a foothold can be obtained. Dr. Parry first detected it here within the limits of the United States. He remarks of it in his Catalogue: "I am informed by Dr. Torrey that this species has never before been found in the United States, but has been obtained in British America and Kamtschatka. In the locality here specified it is quite abundant."[2] It is still abundant, at least on the Wisconsin side of the river, where most of the ferns collected were obtained. Since Parry's discovery of it here it has been found in several localities from northern New England westward, keeping well towards the British Provinces.

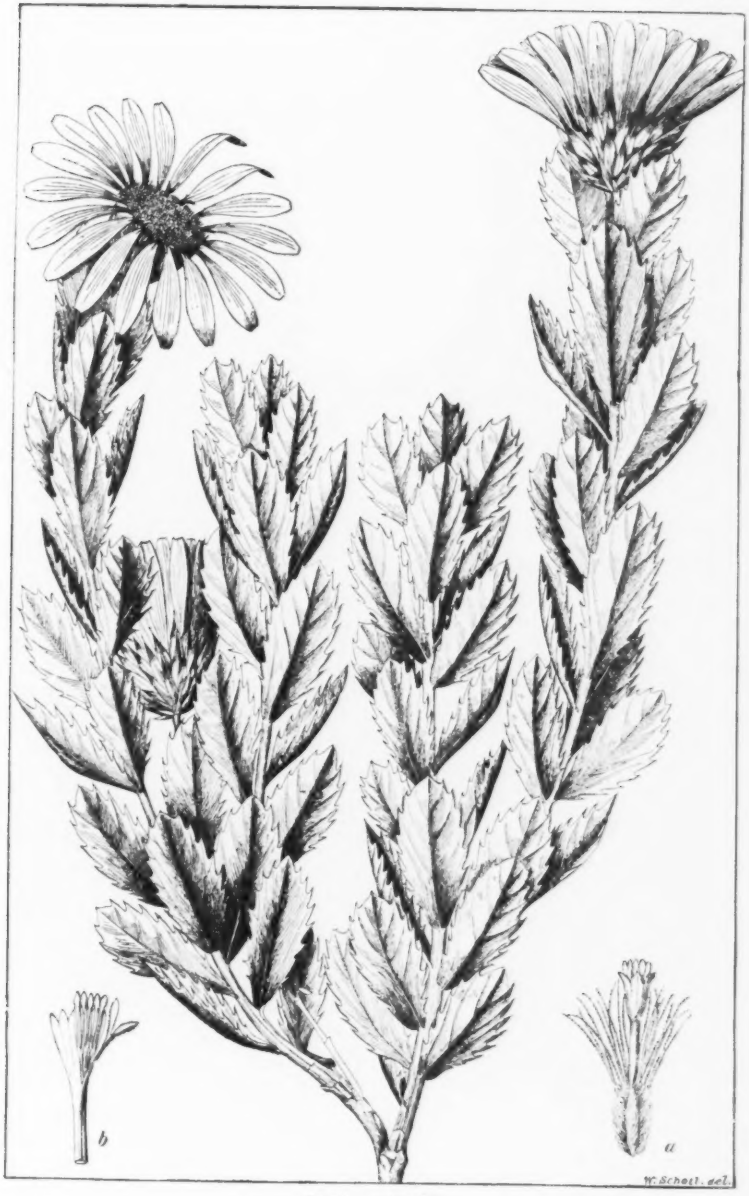
Woodsia obtusa Torr., is seen in similar situations, but is not so abundant. *Woodsia Ilvensis* R. Br., is one of the most frequent of the rock ferns, growing on their exposed faces in all localities. Wherever I have found it, and this has been in many localities from the Saguenay westward in the region of the St. Lawrence and the Great Lakes, it shows itself a plant capable of enduring the severest drouths. The fronds often look crisp and apparently dead, but quickly revive when moistened.

The delicate *Cystopteris fragilis* Bernh. was obtained from the shaded cliffs, and on the Minnesota side a few specimens more like the var. *dentata* Hooker were taken from similar

[1] The Copper-bearing Rocks of Lake Superior, by R. D. Irving.
[2] Owen's Report, p. 621.

places. Once I came across *Camptosorus rhizophyllus* Link. It covered a space of a few square feet on some detached rocks in a deep shady nook beside a pond. This may be where Parry found it, since he gives as its habitat. — "Shaded and detached rocks, Falls of St. Croix." It was my first sight of this fern in the West, though I have often looked for it in favorable localities. The rocks on which it grew were trappean. It is generally, but not exclusively, credited to calarceous rocks. The only place besides this where I have seen it was in Western New York, where it grew in shaded places along the shelves of cliffs of limestone. In that pleasant little book of Williamson, "Ferns of Kentucky," he says of it, "It is found in all our Kentucky woo ls wherever there are detached moss-covered boulders, on outcropping rocks and cliffs either limestone or sandstone."

Another rare or local plant was gathered from the rocks above the village of Taylor's Falls, *Talinum teretifolium* Pursh. Houghton found it here in 1832. It is occasionally met with from Pennsylvania westward to Minnesota in our northern flora, being more common in Minnesota than elsewhere in this range of states. The Manual accords it as a habitat, "serpentine rocks," a much too restricted one. They are not of that character here, being diabase, though chemically, if this be needful, some of the same elements and their compounds could be yielded on decomposition. Upham, in the Minnesota Catalogue, says of the plant, "Rare, occurring only on ledges of rock, (trap, syenite, granite and quartzite)." I have found it but once before, in the silicious sands at Miller's, Lake Co., Ind. In Illinois it is found in "sandy prairies and barrens," as stated in Patterson's "Catalogue of the Plants of Illinois." At Taylor's Falls three other plants accompanied it on the trappean rocks, which are also found with it at Miller's, Campanula rotundifolia, Selaginella rupestris, and Cladonia rangiferina. All these do well in the sand. It shows that the Talinum would be easy to cultivate. Its flowers are pretty, though expanding late in the day and lasting but a short time; but its cylindrical leaves give it an odd though interesting look. It does not rival in the abundance of its flowers its congener from Central America, *Talinum patens* Willd., cultivated for platbands and as a basket plant, but would excel it in being hardy in our latitude, and might be used in a similar way, as well as for rockwork. As Vilmorin



ROSE on ASTER

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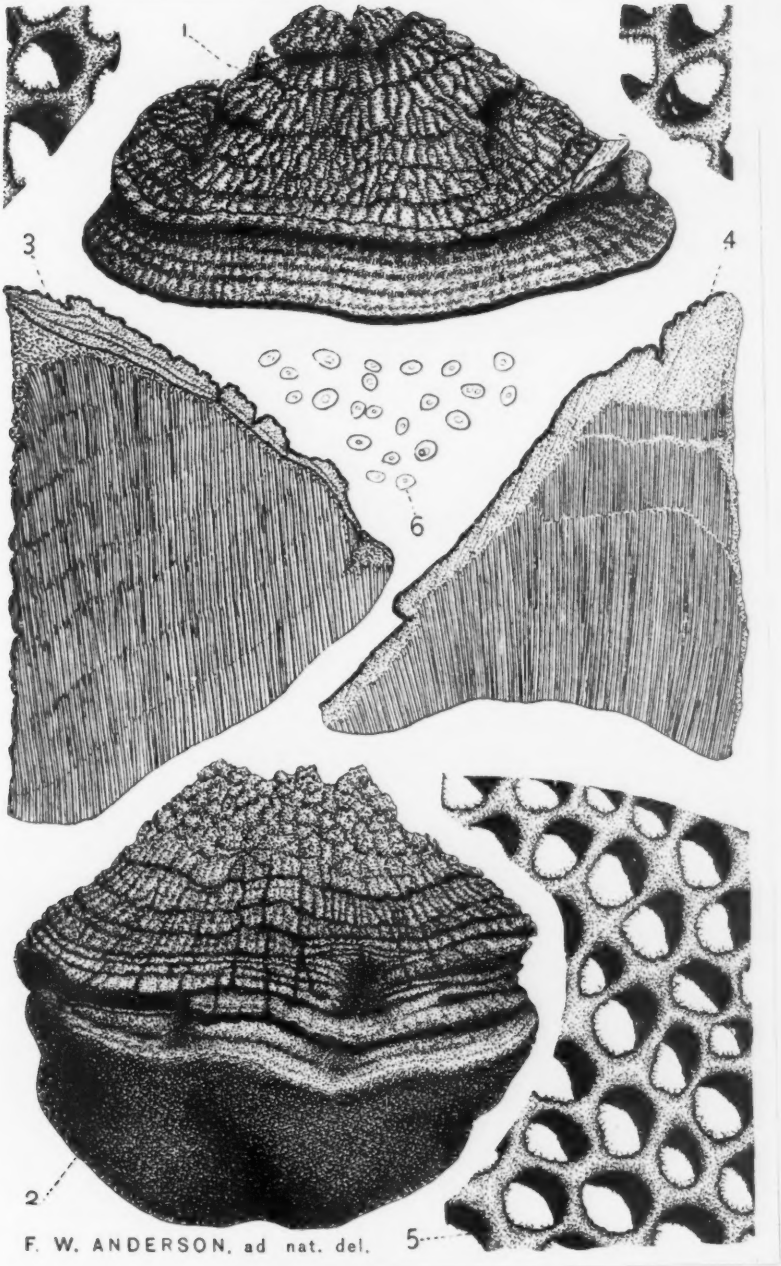

ANDERSON on FOMES.

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says of T. patens, "It keeps fresh in spite of heat and drouth, and will grow vigorously on unshaded rocks."[1]

Not uncommon on the rocks were specimens of *Houstonia purpurea* L. var. *longifolia* Gray. The characteristics were intermediate, allying it more closely to the type than ordinary examples of the variety; the leaves being sometimes three-ribbed and somewhat tufted or rosulate near the root. Several stems usually grow from the same root. The only plants besides calling for notice are, Oxybaphus nyctagineus, seen occasionally on the rocky banks, and Gentiana alba in springy ground.

(Concluded next month.)

Englewood, Chicago.

BRIEFER ARTICLES.

A new Aster from California (with plate XI).—**Aster Orcuttii** Vasey & Rose, n. sp.—Stems suffruticose, somewhat branching, pearly white, glabrous: lower leaves obovate, 1 to 2 in. long, with cuneate base; upper ones often oblong, with broad sessile or somewhat clasping base, obtuse at tip, spinulose-toothed, glabrous: heads solitary and terminal on leafy branches, sessile or nearly so, very large, an inch or more in diameter: bracts of the involucre closely imbricated in 3 or 4 series, oblong with tapering green tips ciliate on the margins: rays an inch long, "lavender to delicate mauve color": disk-flowers 4 lines long, tapering toward the base: style branches broad: achenes densely long white villous: pappus coarse and scabrous.—Collected at "Cariso Creek Wash," Colorado Desert, California (where it is very abundant), April and November, by *C. R. Orcutt*.—This handsome flowered species, although it resembles in habit and leaf some species of Aplopappus, evidently belongs to Gray's section MEGALASTRUM under Aster, and near A. tortifolius. It differs from that species in its almost sessile head, different involucral bracts, obtuse leaves, and larger disk-flowers. Mr. Orcutt obtained seeds of it and considers it worthy of cultivation.—J. N. ROSE, *Department of Agriculture, Washington, D. C.*

A new Fomes from northern Montana. (With plate XII).—**Fomes Ellisianus** Anders., n. sp.:—On the living trunks and larger branches of Shepherdia argentea, valley of the Teton, opposite the "Three Knees," buttes of the Marias river, northern Montana, July 1889. *Anderson, no. 537.*

[1] Les Fleurs de pleine Terre. p. 1124.

Pileus dimidiate, unguliform, 5 to 6 cm. thick, radiate-rugose and zonate; surface whitish and subpulverulent at first, becoming yellowish and glabrate, rimose, and finally of a dark, weather-beaten wood color; margin subobtuse or rounded, in the plane and concave specimens frequently with a distinct edge along its centre: pores stratose, sub-cylindrical, about three to a millimeter (including dissepiments), margins sub-acute, color at first white, finally creamy or faintly yellowish, fragile, easily bruised and rubbed off, leaving the surface ochraceous; surface concave, becoming plane or convex in age. Pores extending nearly through to the upper surface of the pileus, being covered above only by a thin (2–4 mm.) corky, pale-ochraceous layer. Spores hyaline, elliptical-globose or oblong, 5–6×4–5 μ.

In old specimens the annual layer of pores does not extend fully out, so that the margin of the pileus becomes broadly rounded, as described.

Related to *Fomes fraxinophilus* Peck, which species is thinner and broader, not rimose and with the pore walls thicker.

This fine species, Fomes Ellisianus, is very abundant in the Teton valley and doubtless throughout northern Montana and the northwest territory. Shepherdia argentea in these regions frequently grows in dense groves along streams and the fungus with its pileus the color of the host bark and pure white or creamy pore surface forms a striking and beautiful object. It is a pleasure to dedicate this species to Mr. J. B. Ellis, who has so generously helped me in my mycological work in Montana and elsewhere.—F. W. Anderson, *New York City*, Jan. 9th, 1891.

Silphium laciniatum L.—In the Botanic Garden of Harvard University two specimens of *Silphium laciniatum* L. have been cultivated for a number of years. Although these plants differ very noticeably in several particulars, Dr. Gray did not regard them as sufficiently distinct for separate systematic treatment. Sometime ago Dr. Watson kindly called my attention to the plants in question, and expressed the opinion that it would be well after all that they should be described, in the hope that botanists living where this well-known species occurs may observe whether or not these forms are constant enough to receive recognition as varieties. Acting upon this suggestion I have examined the plants and find they have the following distinctive characters:

No. 1. Stem very rough, especially near the summit, where, together with peduncles and involucres, it is covered with bristly white jointed hairs, which are not at all glandular; leaves flat or nearly so, the upper cauline small, with narrow segments and inserted by a narrow clasping

base; the stipular appendages, which are present on the middle cauline leaves, deeply laciniate; involucral bracts rather rigid, acute, erect or spreading, seldom reflexed.

No. 2. Stem, peduncles, involucres, and bracts densely covered with a very short brown glandular pubescence with only occasional white jointed hairs; leaves not flat but conspicuously curled or "crisped," the upper cauline larger and more numerous than in no. 1, sessile with very broad cordate clasping bases; stipular appendages of the others subentire or toothed, but not deeply laciniate; scales of the involucre long-acuminate, thinner than in no. 1, and nearly always abruptly reflexed. Blooms late in October, a month or more after the other. I have thus far been unable to detect any difference in the flowers, except that the rays of no. 2 are distinctly paler than no. 1.

Unfortunately it is not known from what localities the plants in the Harvard Garden were taken. On comparing them with the specimens in the Gray Herbarium, I find that the first is the more usual form; while only one specimen in the herbarium (from Lexington, Ky., collected by Short,) approaches nearly to no. 2.

It has long been recognized that S. laciniatum is subject to considerable variation in stem and foliage, and efforts have accordingly been made from time to time to separate as varieties or even distinct species some of the more remarkable forms of this polymorphic plant. In these attempts, however, the distinctions have been based chiefly upon such characters as the depth to which the leaves were divided, the paniculate or subspicate inflorescence, the presence of copious resin, etc., which have proved unsatisfactory for systematic purposes; since the division of the leaves, and character of the inflorescence are very variable, even in the same individual. It remains to be seen whether the characters here described will be found more serviceable. Most important among them, I think, is the nature of the pubescence, as there the difference is scarcely one of degree, but rather of kind.

As I hope to contiuue my study of the forms of S. laciniatum, I should be much indebted for specimens of, or facts concerning this widely distributed species. Information about the range of the glandular-stemmed variety (no. 2), or the possible occurrence of intermediate forms will be especially acceptable.— B. L. Robinson, *Cambridge, Mass.*, Dec. 1890.

The propagation of Ranunculus lacustris Beck & Tracy.—That little is positively known of the true length of time that this plant lives, is evidenced by the following quotations:

"Perennial by rooting from the nodes, if at all." (Gray's Manual, revised edition, under R. multifidus.)

"It probably lives about a year. The seedlings appear late in the autumn, along the banks and in the bottoms of dried up pools ready to make an early growth in the following spring." (Dr. C. E. Bessey, in American Naturalist, May, 1890.)

"On Staten Island, it certainly appears to be perennial." (Dr. N. L. Britton, in Bulletin of Torrey Botanical Club, July, 1890.)

My attention was attracted to the plant early in May, when I found it blooming in great profusion in this vicinity, many of the flowers being double. Its habitat, about Alma, is chiefly shallow ponds, made by the collection of surface water in slight depressions in the clayey soil of the region. These ponds are often dried up early in the summer in dry seasons, particularly since the forests have been cut off. During the latter part of May and throughout June, 1890, there was a long continued drought, so that by the middle of July, very many of these ponds were nearly or quite dry. About this time my interest in R. lacustris was renewed by the note in regard to it in the Bulletin of the Torrey Botanical Club for July, and I visited some of its favorite haunts to find out what its condition was at that season.

The date as recorded in my note-book was July 21st. The water of the pool was all gone, leaving a soft mud on the bottom and apparently no specimens of the plant alive. On closer examination, however, I found that the plants were there, but in a condition hardly recognizable. The floating stems were prostrate on the mud or partly buried in it, their finely dissected leaves dry and withered or entirely gone. The stems, however, were alive and green, and at the nodes were clusters of small leaves and budding rootlets. Even at this time there were many cases, in which parts of stems had disappeared and the new plants had established themselves. An interesting fact in this connection was the marked brittleness of the stems of the old plants — they broke very readily, so that it was hard to disentangle them from the mud and weeds without snapping them into bits. During the summer I visited the same and similar localities several times, and in a very little while after my first visit I found that all traces of old stems had disappeared, and that the young plants were making vigorous growth and might have been mistaken for seedlings. These plants rooted vigorously, sending out large clusters of threadlike fibrous roots and numerous petiolate three parted leaves, with cleft divisions. The petioles and under sides of the leaves were generally decidedly pubescent. Under the date, Sept. 15th, I find the following in my notes:

"These plants have continued to grow until, in many cases they are four or five inches in height, quite pubescent and in many places so crowded as to densely carpet the dry bed of the ponds in which they

grow." I was unable to decide whether the young plants sent out runners as soon as they were well rooted, but there were some indications that such was the case, as they became densely crowded in places where apparently there were but few specimens in the beginning. If there were such runners they soon disappeared and the plants stopped sending them out. Two other possible explanations suggested themselves to me; one, that such part of the stems of the old plants as were well covered with mud retained their vitality much longer than those not so protected, and appeared like runners, as the surface of the mud became drier and shrunk away; the other, that part of these young plants were seedlings, but if they were such their growth was exceedingly rapid, for the plants in given clusters were very nearly of the same size. At the date given above, the axes of the plants had not increased materially in length. The leaves were practically all radical and because of the crowded condition of the plants, long petioled. Shortly after the middle of September the fall rains set in, and water began to collect again in the ponds. At this time the stems began to grow, at first with very short nodes, but later, as the water became deeper, with longer ones. The greater number of plants sent out branches from the nodes of the stem even when the internodes were short. As the water grew deeper during the fall, the leaves which were submerged died and new ones, more finely cut, replaced them, and by the time the plants were entirely covered the foliage was as finely dissected as that of the aquatic flowering form. On the 18th of October I found two plants in bloom. The water had hardly reached them and the stems were trailing with rootlets projecting from the underside of the nodes. The leaves of these specimens were petiolate and between the dissected form of the aquatic plant and the cleft and parted form characteristic of the terrestrial plants of the summer. The flowers were somewhat smaller than the usual aquatic ones. On my last visit made late in November, just as the ice was beginning to form, I found that the depth of water in the ponds had materially increased and that the submerged plants had made strong and rapid growth, and were entirely typical in foliage and other particulars. The summer leaves were all dead and brown, while the new ones were green and vigorous. Some plants which I had transplanted above high water mark, were still living, but showed no marked growth as in those under water, and the leaves were unchanged. From these considerations, if we consider the observed conditions of growth and propagation normal, and there is no evidence to the contrary, our plant is truly perennial, since the old stems live long enough to nourish and thoroughly establish the plantlets which develop at their nodes

after the flowering season is over.—CHAS. A. DAVIS, *Alma College, Alma, Mich.*

Cornus Baileyi C. & E. in Oregon.—In the revision of Cornaceæ (Coulter and Evans), under the discussion of the relationship of *C. stolonifera* Michx., *C. pubescens* Nutt., and *C. Baileyi C. & E.*[1] the prediction was made that C. Baileyi might be found along the Pacific coast and its ranges, where it had descended from its already known habitat of British America, and that it would be confounded with C. pubescens. Such has since proved to be the case. In a package of plants recently received from Messrs. Drake & Dickson, Portland, Oregon, there was found an undoubted specimen of C. Baileyi from Castle Rock, Columbia River, Oregon, bearing the date June 1889 as to flowers, the fruit evidently being of later collection. As in the east, C. Baileyi has been confused with C. stolonifera on account of the presence of some appressed pubescence, so here it had been labeled C. pubescens, evidently on account of the rather loosely pubescent under surface of the leaves. But an examination with a lens showed the presence of both appressed and wooly pubescence, such as is found in C. Baileyi and not in either of the others. The stone in this specimen is nearly twice as broad as high, is prominently flattened, has the square-shouldered top of typical C. Baileyi, and has its rather deeply furrowed edge. This combination of characters can leave no doubt as to the occurrence of C. Baileyi on the west coast. It is highly probable that forms may be found not so well defined as this one, and the presence of all three of these nearly related species will give more or less trouble when approaching each other, yet the extreme forms should give no cause for difficulty in determination.—WALTER H. EVANS, *Indianapolis, Ind., Herbarium Eli Lilly & Co.*

NOTE.—A private letter from E. J. Hill, of Englewood, Ills., makes the following statements concerning C. Baileyi: "My first note on it was in Sept. 1875, and it was called C. stolonifera. But studying this lake shore shrub in other years it seemed C. sericea, but the fruit was not colored rightly. It was too ruddy a shrub for C. paniculata, and so has remained a source of doubt till your characterization appeared. Noticing them the other day (January) while taking a trip in the Pine Barrens, the color of the canes of the two contrast considerably. When the leaves are off, we get the color to the best advantage. Those of C. stolonifera are very bright red and glossy in winter, of a hue almost crimson, while those of C. Baileyi are duller, a little of the brick-red cast. I think one could be pretty sure of identity in the winter, from this character alone." J. M. C.

[1] Bot. Gazette, xv. pp. 38 and 88.

EDITORIAL.

THE UTILITARIAN side of botany is one that is not attractive to the majority of botanists, unless it be in that intensely personal way embodied in the retort of a Harvard professor when annoyed by the inconsiderate question of a visitor to whom he was showing an object under the microscope. "And what is the use of it all", said the visitor. "It brings me my bread and butter", was the quick reply. It is to be feared that there are botanists who would feel that the science was sufficiently recognized if a proper number of places with comfortable salaries attached were provided for deserving aspirants, who might retire from the distractions and contamination of the world and devote their lives to pure science without being prodded into giving a thought to any possible application of their results to the practical affairs of life. Such positions are never likely to be numerous. In the meantime the world is clamoring for chemists and electricians and representatives of other departments of science to stand as sureties that capital shall not be misdirected. The increasing variety and complexity of the requirements makes evident the necessity for a more complete knowledge of the principles involved, and thus a return road is open to original investigation. This not only means a readier recognition of the value of the science, but increased tolerance for its more abstruse phases that appear to have no present relation to commercial life.

MEDICINE WAS the first patron of botany, and in foreign countries is still one. The early botanists were physicians, and studied plants to discover their medical properties. The first botanic gardens were founded with this purpose in view. Afterward came the study and cultivation of plants brought together by travelers and explorers with the expectation of an increase of the natural productions upon which commerce thrives. This is especially marked in the maritime nations, such as England and France. It is the principal motive for the maintenance of the Royal Gardens at Kew. In America, neither of these interests have much affected the growth of the science. In fact, not until recently has botany been much called upon to lend material aid to the development of the western world. This time it is agriculture that lends a hand, and it has come largely through the establishment of the agricultural colleges, the agricultural experiment stations and the section of vegetable pathology in the Department of Agriculture at Washington. However, none of these gave the initiative to the present train of thought. It came from a visit to a large pharmaceutical establishment at Indianapolis, in which a professional botanist is

employed, with facilities for doing good work both for his employers and for science. Why may we not hope that other and various kinds of commercial enterprises may find it profitable to make use of the services of well trained botanists? The science is not likely to lose anything by it, and there are possibilities of considerable gain.

CURRENT LITERATURE.

Minor Notices.

EDUCATION for March contains an article by Prof. Conway MacMillan in which the evils of the common three-months course in botany are vigorously exposed, as they have been many times before, and will need to be many times more. The theme is an inexhaustible one and the remedy proposed will be as polymorphous as the writers are nuerous. For example: in our judgment the remedy lies in the education of the teacher and not necessarily in the change of course.

BOOKS ON the diseases of plants are increasing. The third one in the English language has just been issued, and imitates its predecessors in form, size, and in its British origin. The work is by Dr. A. B. Griffiths,[1] and deals with the injuries to plants brought about by plant, animal and other agencies. A large number of plant affections are treated in a very brief manner, and in most instances a cure or preventive is given. Two drawbacks to the usefulness of the work are prominent: the inadequate accounts of the maladies, and the rather antiquated character of part of the information that is included. The author has made a praiseworthy attempt to provide (suggest does not seem to be the right word) remedies and preventives, but they are largely founded upon general principles, such as: destroy all infected plants, apply a solution of iron sulphate, topdress the land with gas-lime or quicklime. England is far behind the United States in the knowledge and use of specific remedies for plant ailments.

DR. ROLAND THAXTER has issued a supplementary note (Proc. Am. Acad. p. 261, presented Jan. 14, 1891) to his former paper on N. Am. *Laboulbeniaceæ*. The additions of a single season have been so unexpectedly large and important that it has been thought wise to defer the promised monograph. With the present additions, the species of

[1] GRIFFITHS, A. B.—The diseases of crops and their remedies: a handbook of economic biology for farmers and students. pp. 174. Illustrated. 12°. London: George Bell & Sons, 1890. 2s. 6d.

this family in North America already outnumber all the known exotic species. A remarkable new genus *Zodiomyces*, is described, and forms a distinct departure in the group. *Hesperomyces* is another new genus; while *Peyritschiella* receives a new species, and *Laboulbenia* six.

WE HAVE RECEIVED the advance sheets and plate proofs of Ellis & Everhart's North American Pyrenomycetes. The illustrations are all original, the drawing having been the work of Mr. F. W. Anderson. There are 41 plates, each one accompanied by a page of explanatory text. We understand that 4 more plates will be issued as a supplement. In looking over the plates it is evident that the volume will be a boon to American mycologists, and that this large and rapidly increasing group of botanists will warmly welcome its appearance.

OPEN LETTERS.

Mounting plants.

THOSE WHO have had experience in mounting plants for the herbarium will readily understand why Prof. Beal should "decidedly favor" fastening down grasses with gummed strips, for of all things grasses are the most refractory subjects to glue down, and unless the work is expertly done and the stout culms immediately stayed by strips (without waiting for these to "spring up" before being "patched up,") there is likely to be displayed all the defects and drawbacks which our friend specifies. But it has occurred to me that notwithstanding Prof. Beal expressly restricts his remarks to the "mounting of grasses and allied plants" there might be some who would construe them into a qualified condemnation of the glue process from beginning to end. This, I take it, was not intended. Excepting the grasses there is not another large order of plants which the writer, for one, would not much prefer glued down; the Compositæ, Leguminosæ, Rosaceæ, Umbelliferæ and even the Cyperaceæ. A delicate Astragalus or Vicia can be neatly and expeditiously mounted so that every flower and leaflet in contact with the sheet will be securely fastened and that, too, without showing a particle of "surplus glue" to mar the perfection of the work; the same may be said of all the Umbelliferæ, but more especially of those with finely dissected leaves; while as for the Compositæ they are so easily glued down, held so firmly, look so well after the work is done, are so convenient to handle and easy to study, I can not concieve of two opinions being entertained as to the preferable mode of mounting them. Were the objection that specimens "not mounted right side out" can not be turned over, really as formidable as it appears in the statement it would have long ago led to the abandonment of gluing down. As a matter of fact I do not recall, in thirty years' experience, having ever been balked by a specimen mounted wrong-side up. Nor does gluing prevent the detachment of small fragments for more careful examination with the aid of those capital help-

ers the cup of hot water and low power microscope. It is a poor and meager specimen, indeed, from which such little bits as are required for this purpose can not be taken without injury, but even this will be obviated when collectors learn to preserve surplus flowers, fruits, etc., for subsequent dissection.

Much has been said, one time and another, about the convenience of loose material for study, with the implication that mounted material was inconvenient just in proportion to the security of the attachment to the harbarium sheet. For my own part I avoid, as much as possible, handling loose specimens, and *for study* prefer things securely mounted. My mind is then relieved of any undercurrent of care lest labels or specimens get misplaced, I find open spaces left on the sheet for any sketches or analyses that I may care to make, and the identical fragment had under examination can be placed in a pocket alongside to attest the accuracy of the drawing. Notes can be written down and all this will remain while the sheet lasts as certainly appertaining to the very specimen made the subject of study. I can go so far as to mark with a little × the precise spot in head, spike, ament or what not, from which I detached my fragment for examination. For effecting such detachments with a minimum of injury to the specimen I use a tool painfully suggestive of a dentist's outfit, but really of more agreeable antecedents, a fine little chisel made by breaking off the hook of a steel crochet needle and then sharpening the end to a crosswise edge. The long handle gives a firm hold, the cutting edge is very narrow and with a steady thrust, under a lens, one may cut just the part desired without bringing away, unintentionally, ten times more than is wanted. —M. S. Bebb, *Rockford, Ills.*

NOTES AND NEWS.

Rev. Francis Wolle's "Diatomaceæ of North America" has just been issued. It contains 2300 figures and 112 plates.

In the *Public Ledger* (Feb. 19) of Philadelphia Mr. Thos. Meehan has published a long and interesting account of Rafieesque.

In the article of Dr. Homer Bowers on Hydrastis Canadensis, which appeared in the March number, the following corrections should be made: p. 76, 9th line from bottom, "inclines" should read "inclined"; p. 77, last line, erase "not." This last is naturally a very important correction.

Under leave of absence from the University of Wisconsin Prof. Chas. R. Barnes will spend the time from April to September at Cambridge as assistant in the Gray Herbarium. It is the intention of the director, Dr. Sereno Watson, to have the important bryological collections rendered available to students as soon as possible. The initiation of this work together with the revision of the Field, Forest and Garden botany which is in progress, will occupy Prof. Barnes' time. Correspondents will please note the change of address.

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